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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/556,355	11/10/2005	Hachishiro Iizuka	281154US26PCT	6745
22850 7590 11/02/2007 OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER CHEN, KEATH T	
			ART UNIT 1792	PAPER NUMBER
			NOTIFICATION DATE 11/02/2007	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/556,355

Applicant(s)

IIZUKA, HACHISHIRO

Examiner

Keath T. Chen

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 September 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,6 and 8-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,6 and 8-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

The claim amendment filed on 09/14/2007, addressing claims 1-28 rejection from the first office action (06/14/2007) and canceling claims 5 and 7. Amendments to claims 1, 6, 8, 17, and 24 are entered.

The abstract amendment filed on 09/14/2007 is acknowledged and entered.

The terminal disclaimer filed on 09/14/2007 is acknowledged and entered.

Terminal Disclaimer

1. Double patenting issue has been overcome by the terminal disclaimer filed on 09/14/2007. Double patent rejection has been withdrawn.

Response to Arguments

2. Regarding the cancellation of claim 7 and amendment of claim 8, see page 11, rejection under 35 USC 112 on claims 7-8 has been withdrawn.
3. Applicant's arguments, see pages 11 and 12, with respect to rejection under 35 USC 102(b) of claims 1-5 and 25 based on Naoki '487 have been fully considered but they are not persuasive.

Applicants argue that the side heater (#217) and top heater (#218) are not directly connected to the heater (#216). This argument is not consistent with Fig. 13 of '487.

4. Applicant's arguments, see pages 12 and 13, with respect to rejection under 35 USC 102(b) based on Sun '839 does not fit the limitation of amended claims 1 and 25, have been fully considered and are persuasive. The 35 USC 102(b) rejection of claims 1 and 25 based on '839 has been withdrawn.

Art Unit: 1792

5. Applicant's arguments, see pages 13-16, with respect to rejection under 35 USC 103(a) based on '487 and Zhao '978 does not fit the limitation of amended claims 6, 24, 26, 28, 7, 8, 10-13, and 15, have been fully considered but they are not persuasive.

Applicant's argument (page 15, 2nd paragraph) is based on that "one heating element (216) were placed in front of the heating element (216), it is not necessarily true that gas material ... would be prevented from directly reaching the filter member while traveling in a straight path ...". This argument is unconvincing. As stated in the first office action, page 11, 2nd paragraph, "the circuitou(r)s through-passages would have 'prevent(ed) the gas material in the vapor chamber from directly reaching the filter member'", (circuitous through-passages was cited on page 10, 7th line from the last).

6. Applicant's arguments, see page 16, with respect to rejection based on Kim '802 does not fit the limitation of amended claims 17, 20, 22, and 27, have been fully considered and are persuasive.

Applicant argues the term columns cannot be applied to vessels containing fluid, which is not persuasive as commonly used term such as distillation columns and chromatography columns.

The new limitation in the amended claim 17 overcomes the existing rejection based on '802. Rejection based on '802 has been withdrawn (along with USC 103(a) rejections on claims 18, 19, 21, and 23). This amendment necessitates new ground of rejection and will be discussed below.

Art Unit: 1792

7. Applicant's arguments, with respect to rejection of claims 4, 8, and 10-16 (pages 16-18) are based the patentability of parent claims (1 or 6 respectively). Since the parent claims are found not patentable, these claims remain rejected.

Claim Interpretation

Claim 23: "A filter member ... configured to allow the gas material to pass therethrough between the gas outlet and the plate member" will be interpreted as "gas pass between the gas outlet and the plate member", not "a filter member between the gas outlet and the plate member".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-4, 17-23, 25, and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Naoki et al. (US 6074487, hereafter '487).

'487 teaches all limitations of claim 1:

A vaporizer (Fig. 13, #206) comprising: a vaporizing chamber (S1) configured to vaporize a liquid material (M) and thereby form a gas material (M+X); a spray portion (#205, col. 11, lines 8-10) configured to spray the liquid material in the vaporizing chamber; a delivery part (including #220 and #216, everything outside of chamber S1 is for delivery) configured to deliver the gas material from the vaporizing chamber to a gas outlet; and a heating portion (#215-#218) configured to heat the vaporizer, wherein the delivery part comprises a filter member (#216, porous heating element function as filter, col. 10, lines 55-57) covering the gas outlet

Art Unit: 1792

(#216 is between sprayer #205 and outlet #220) and configured to allow the gas material to pass therethrough, and a heat transfer member (side heater #217 and top heater #218 are directly connected to #216 filter, col. 10, lines 29-34) configured to transfer heat of the heating portion to the filter member, wherein the heat transfer member is in thermal contact with the filter member at a position other than a peripheral portion (#217 and #218 are in direct contact with the center portion of the surface of the filter #216).

'487 further teaches the limitations of:

Claim 2: A control member (col. 14, lines 18-20) configured to control temperature of the heating portion based on temperature of the heat transfer member or the filter member (thermal coupler #221 connected to the filter, col. 10, lines 35-37).

Claim 3: The heat transfer member comprises a plurality of heat transfer members (#217 and #218).

Claim 4: The vaporizer further comprising a heater incorporated in the heat transfer member (heaters #217 and #218 are the heat transfer members, therefore, the heaters are incorporated in the heat transfer members).

'487 also teaches all limitations of claim 17 (besides the limitations in claims 1):

The delivery part comprises a plate member (#218) covering the gas outlet (#220) and a wall (#203, upper cover) around the gas outlet, with a gap therebetween to form a communication clearance, such that a gas passage connecting the vaporizing chamber to the gas outlet is formed between the plate member and the wall, a plurality of columns (#221, thermocouple, and other unnamed parts in the gap) disposed in the gas passage to serve as a fluid baffle, the columns extending from the wall around the gas outlet to the plate member (as

Art Unit: 1792

shown), and a heater (#218 is also a heater) configured to heat the gas material flowing through the gas passage.

'487 further teaches the limitations of:

Claim 18: The heater is embedded in the plate member (it is the same part #218).

Claim 19: The plate member has a surface (the bottom side of #218) facing the vaporizing chamber and configured to serve as a vaporizing surface for vaporizing the liquid material (col. 10, lines 17-22).

Claims 20-21: The plurality of columns serve as the heat transfer member (The columns are inherently capable of transferring heat and contact #218 other than at the peripheral portion).

Claim 22: A temperature control section (col. 14, lines 18-20) configured to control temperature of the heating portion based on temperature of the plate member (thermocouple #221 connected to the filter, col. 10, lines 35-37).

Claim 23: A filter member covering the gas outlet (top of #216 covers #220 relative to chamber) and configured to allow the gas material to pass therethrough between the gas outlet and the plate member (#216 does not hinder the pass of gas material therethrough).

'487 further teaches the limitations of claims 25 and 27:

An apparatus (Fig. 1) for performing a semiconductor process on a target substrate, the apparatus comprising: a process chamber (#1, col. 6, lines 58-66) configured to accommodate the target substrate; and a gas supply system (#12, Fig. 13 is one embodiment of #12, see drawing description) configured to supply a process gas into the process chamber, wherein the gas supply system comprises the vaporizer according to claim 1 (or 17).

Art Unit: 1792

9. Claims 6, 8-10, 12, 14-16, 24, 26, and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Sun et al. (US 6409839, hereafter '839).

'839 teaches some limitations of claim 6:

A vaporizer (Fig. 11) comprising: a vaporizing chamber (space above #150) configured to vaporize a liquid material and thereby form a gas material (col. 10, lines 8-10, note aerosol is fine liquid droplet, still a liquid material); a spray portion (#18) configured to spray the liquid material in the vaporizing chamber; a delivery part (including #150 and everything below is for delivery) configured to deliver the gas material from the vaporizing chamber to a gas outlet; and a heating portion (#158) configured to heat the vaporizer, wherein the delivery part comprises a filter member (#160, col. 10, lines 16-17) covering the gas outlet (opening below #166) and configured to allow the gas material to pass therethrough, and a shield plate (#150) covering the filter member on a side farther from the gas outlet and interposed between the vaporizing chamber and the filter member (#150 is between the vaporizing chamber and #160) to prevent (hinder or intercept, Thesaurus.com) the gas material, which flows toward the gas outlet, from directly reaching the filter member while traveling in a straight path from the vaporizing chamber.

'839 further teaches the limitations of:

Claim 8: A gas passage heated (between bottom of #150 and the top of #160 is heated by the bottom half of the heater #158) is formed between the filter member (#160) and a shield plate (#150) to deliver the gas material to the gas outlet.

Art Unit: 1792

Claim 9: A clearance (between the outmost plate of #150) is formed around the shield plate to allow the vaporizing chamber (space above #150) to communicate with the gas passage (#156, which is the space below #150).

Claim 10: An opening (#152) is formed in the shield plate (#150) to allow the vaporizing chamber to communicate with the gas passage.

Claim 12: A control member (Fig. 9, col. 8, lines 61-65) configured to control temperature of the heating portion based on temperature of the shield plate (which sensor #106B is adjacent to).

Claim 14: A temperature sensor (#106B) disposed at the shield plate, wherein the control member is configured to control the temperature of the heating portion based on a signal detected by the sensor.

Claim 15: A heater (#158) incorporated in the shield plate (#150 surrounds #158).

Claim 16: The heating portion comprises a heater embedded in a wall of the vaporizing chamber (Fig. 10, #126, col. 9, lines 30-33 and line 66 to col. 10, line 2).

Claim 24 is rejected with substantially the same reason as claim 6 rejection above, '839 further teaches the limitation of claim 24:

A heat transfer member (#160B) configured to transfer heat of the heating portion (#158) to the filter (#160, indirectly).

'839 further teaches all limitations of claim 26 (and 28):

An apparatus (Fig. 9) for performing a semiconductor process on a target substrate, the apparatus comprising: a process chamber (#122) configured to accommodate the target substrate (col. 8, lines 13-14); and a gas supply system (the rest of Fig. 9) configured to supply a process

Art Unit: 1792

gas into the process chamber, wherein the gas supply system comprises the vaporizer according to claim 6 (and 24).

10. Claims 6, 24, 26, and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Zhao et al. (US 20030033978, hereafter '978).

'978 teaches all limitations of claim 6:

A vaporizer (Fig. 15, #154, [0081]) comprising: a vaporizing chamber (inside of #177) configured to vaporize a liquid material and thereby form a gas material ([0081], lines 4-7 and lines 12-14); a spray portion (#170) configured to spray the liquid material in the vaporizing chamber; a delivery part (everything outside of #177, including #177, is for delivery) configured to deliver the gas material from the vaporizing chamber to a gas outlet (#184); and a heating portion (#167) configured to heat the vaporizer, wherein the delivery part comprises a filter member (#180) covering the gas outlet and configured to allow the gas material to pass therethrough, and a shield plate (#177 and #178) covering the filter member on a side farther from the gas outlet and interposed between the vaporizing chamber and the filter member (#177 and #178 are between the vaporizing chamber and #180) to prevent the gas material, which flows toward the gas outlet, from directly reaching the filter member while traveling in a straight path from the vaporizing chamber ([0051], lines 23-26).

The examiner notes that #177 and #178 can function as filter and shield plate as well.

Claim 24 is rejected with substantially the same reason as claim 6 rejection above, '978 further teaches the limitation of claim 24:

Art Unit: 1792

A heat transfer member (lower block #186, [0084], lines 21-24, describes heat transfer to #177, [0085], lines 9-12, heat transfer to #178, therefore, #180 is similarly receiving heat from lower block #186) configured to transfer heat of the heating portion (#167) to the filter (#180).

'978 further teaches all limitations of claim 26 (and 28):

An apparatus (Fig. 1, #10 CVD system, [0042]) for performing a semiconductor process on a target substrate, the apparatus comprising: a process chamber (#12) configured to accommodate the target substrate; and a gas supply system (#16, Fig. 15 is one embodiment of #16) configured to supply a process gas into the process chamber, wherein the gas supply system comprises the vaporizer according to claim 6 (and 24).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over '839, further in view of '978.

Art Unit: 1792

'839 teaches all limitations of claim 10, as discussed above. '839 also states multiple filter #160 can be used (col. 10, lines 16-17) and arranged as desired (col. 10, lines 23-24).

'839 does not teach the limitation of claim 11:

The opening comprises a slit, which is bent in a thickness direction of the shield plate.

'978 is an analogous art in the field of vaporizer for CVD, particularly in solving the problem of clogged vaporizer with unvaporized precursor ([0008], lines 6-10, similar to the temperature uniformity and particulate formation problem '839 is solving, col. 2, lines 17-22). '978 teaches the use of several tubes with varying porosities as described in claim 6 rejection above and provides sintered material having circuitous through-passages ([0051], lines 23-28). '978 further provides motivation "a vaporizer with increased surface area which exposes the mixture to a large area of evenly heated surfaces and filters out liquid droplets entrained in the flow" ([0091], lines 2-7).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have combined '978 with '839. Specifically, to have provided multiple sintered porous plates in Fig. 11 of '839 (instead of just one filter #160) for the purpose to provide increased surface area to filter out liquid droplets, with a reasonable expectation of success.

In the above arrangement, the innermost sintered porous plate would have functioned as the filter while the outer sinter porous plates as "shield plates" to protect the inner plate. The outer sintered porous plates (the shield plates) would have had numerous pores with some slits bent in a thickness direction.

12. Claims 12 and 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over '978, further in view of '487.

Art Unit: 1792

'978 teaches all limitations claim 6, as discussed above.

'978 also teaches the limitation of:

Claim 12: A control member ([0093], last sentence) configured to control temperature of the heating portion (within the body #166, [0093], last sentence).

Claim 13: The temperature of the filter member or the shield plate is set at substantially the same as the temperature of the heating portion (isothermal, [0093], line 5. Note this is intended use and has no structural limitation).

'978 does not explicitly teach the limitation of:

Claim 12: based on temperature of the filter member or the shield plate.

'487 is an analogous art in the field of vaporizer, particularly solving the problem of reliquidization (col. 10, lines 29-34) by providing heater next the filter (heaters #217 and #218 to filter element #216 in Fig. 13) and teaches a thermocouple (#221) connected to the filter #216 for the purpose of controlling the temperature (col. 10, lines 35-37).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have combined '487 with '987. Specifically, to have located the temperature measurement location based on the temperature of the filter, as taught by '487, to the apparatus in Fig. 15 of '978, for the purpose of controlling temperature, with a reasonable expectation of success.

'978 discloses the claimed invention except for the location of the thermocouple. It would have been an obvious matter of design choice to place the location of the thermocouple, since it has been held that rearranging parts of an invention only involves routine skill in the art. In re Japikse, 86 USPQ 70.

Art Unit: 1792

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keath T. Chen whose telephone number is 571-270-1870. The examiner can normally be reached on M-F, 8:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KC

K.C.

Richard Bueker

Richard Bueker
Primary Examiner
Art Unit 1792